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BIOLOGICAL SURVEY OF PINKHAM CREEK AND THE NORTH PLATTE RIVER IN THE VICINITY OF COWDREY, COLORADO AUGUST 24, 1972

Environmental Protection Agency
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November 1972

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BIOLOGICAL SURVEY OF PINKHAM CREEK AND THE NORTH PLATTE RIVER IN THE VICINITY OF COWDREY, COLORADO

AUGUST 24, 1972

TECHNICAL SUPPORT BRANCH
SURVEILLANCE AND ANALYSIS DIVISION

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

November 1972

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INTRODUCTION

On August 10, 1972, the Enforcement Division of Region VIII requested a biological survey of Pinkham Creek and the North Platte River near Cowdrey, Colorado. The survey was requested to document any change in stream biota that may have resulted from a reported discharge of suspended solids from the Ozark-Mahoning Company on June 18, 1972.

Biologists from the Surveillance and Analysis Division conducted a survey of Pinkham Creek and the North Platte River in the vicinity of Ozark-Mahoning's discharge on August 24, 1972. Station descriptions are listed in Table 1.

METHODS

All quantitative samples were collected with a square foot Surber sampler. Qualitative samples were collected by hand picking organisms from selected rocks and debris. All samples were preserved in 10% Formalin and transported to the Regional Laboratory in Denver, Colorado for processing.

DISCUSSION

The Ozark-Mahoning Company mines and processes fluorspar from an area near Cowdrey, Colorado. Both mining and process waters are discharged to a series of lagoons where they are treated and then discharged to Pinkham Creek. However, according to a memorandum from the Enforcement Division, Region VIII, the company has a history of highly turbid discharges to Pinkham Creek. Chemical analyses of samples collected from Pinkham Creek at the time of discharge on June 18, 1972, revealed a total solids content of approximately 1600 mg/l.

downstream from the discharge, compared to 224 mg/l total solids upstream.

Suspended solids that are discharged to a stream can settle out on the bottom and affect the benthic invertebrate community. Areas in which bottom organisms live may be blanketed by thick layers of sediment which smother trapped organisms. Organisms such as stoneflies and mayflies have sensitive gills that may be damaged by the grinding action of sediments. Burrowing midges may be reduced in number because of a lack of food in the sediment. Many free-living organisms also tend to drift out of an area in proportion to the concentration of suspended solids (Gammon, 1970).

During the biological survey, Pinkham Creek upstream from the Ozark-Mahoning discharge was clear and low in flow (Station 1, Figure 1). The five foot wide stream had a bottom composed of gravel and rock. Nineteen kinds of organisms numbering 60 per square foot were collected from this station. The benthic community, predominantly stoneflies and mayflies, was indicative of a clean water environment.

Downstream from the discharge (Station 2, Figure 1) the benthic community was slightly reduced in number of kinds and total number of organisms per square foot (11 and 52 respectfully), but did not reflect any damage that might have occurred from a sediment discharge. Pollution sensitive stoneflies and mayflies comprised a majority of the benthic community which appeared to be similar to the clean water community at Station 1 (Table 2). A thin silt overlay covered a stream bottom of rock and gravel. The only indication of possible pollution occurring at Station 2 was a black ring or band around most of the rocks on the stream bottom.

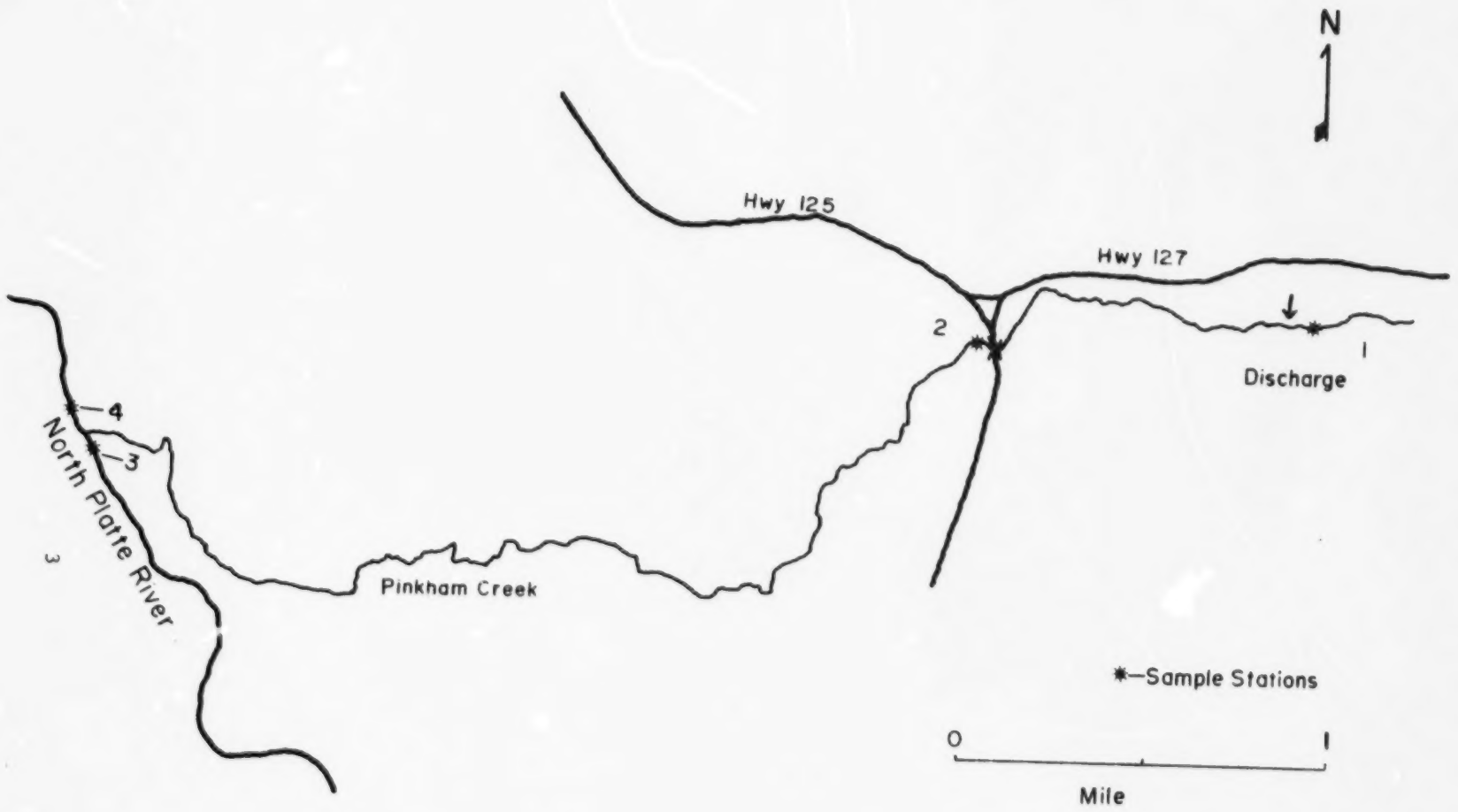

Figure I. Station locations for the biological survey of Pinkham Creek and the North Platte River, Colorado (8/24/72).

In the North Platte River, upstream from its confluence with Pinkham Creek, the benthic community was composed of twenty-two kinds numbering 407 per square foot (Station 3, Table 2). The predominant organisms were caddisflies (370 per square foot), with mayflies and stoneflies also present. The benthic community was indicative of a slightly enriched but clean water stream.

Downstream from the confluence of Pinkham Creek with the North Platte River (Station 4), eighteen different kinds of organisms were collected. The total number of organisms present was 57 per square foot. The number of kinds at Station 4 was similar to the clean water communities at Station 1 on Pinkham Creek and Station 3 on the North Platte River (Table 2). The smaller total number of organisms per square foot collected downstream of the confluence was due to a reduction in the number of caddisflies from 370 upstream to 38 per square foot downstream (Table 2). Two genera of caddisflies were predominant at each location and both genera usually build cases of loosely made gravel or detritis attached to rocks on the bottom. A thick layer of sediment would smother these organisms. Because of their usual sedentary existence, caddisflies would require a longer period of time to re-inhabit an area than other more mobile organisms. Thus, at Station 4, the area improved from a polluted to a clean water station, but the benthic community had not completely recovered.

SUMMARY

On June 18, 1972, the Ozark-Mahoning Company was reported to have made a waste discharge of suspended solids to Pinkham Creek, tributary to the North Platte River near Cowdrey, Colorado.

A biological survey was conducted on Pinkham Creek and the North Platte River to determine any change in stream biota that may have resulted from the waste discharge. At the time of the survey the benthic invertebrate community of Pinkham Creek was typical of a clean water environment both up and downstream from the Ozark-Mahoning discharge. The North Platte River contained a wide variety of pollution sensitive organisms with only a reduction in numbers per square foot of caddisflies downstream from Pinkham Creek to indicate that a source of pollution may have affected the river within the past few months.

APPENDIX

Table 1. Station Descriptions

Station 1	Pinkham Creek approximately 100' upstream from the Ozark-Mahoning discharge.
Station 2	Pinkham Creek 30 feet downstream from the State Highway 125 crossing.
Station 3	North Platte River approximately 50 feet upstream from the confluence with Pinkham Creek.
Station 4	North Platte River approximately 100 yards downstream from the confluence of Pinkham Creek.

Table 2. Bottom Organisms, Pinkham Creek and North Platte River, Colorado, August 24, 1972 (Number Per Square Foot)

Station / Organisms	Pinkham Creek Ups of Oz.Mah	Pinkham Creek DWS Oz. Mah @ Hwy 125	N. Platte Ups confluence	N. Platte DWS confluence
Plecoptera				
Isoperla sp.	Q			2
Nemoura sp.	Q			
Pteronarcella sp.	4	5		
Arcynopteryx sp.	6	1	1	
Perlidae			1	2
Chloroperlinae	2			
Nemoura		11		
Isogenus			3	2
Ephemeroptera				
Baetidae	Q			
Baetis sp.	27	20	17	4
Ephemerella sp.	1		Q	2
Heptagenia sp.			Q	Q
Paraleptophlebia sp.			Q	
Ameletus sp.		5	3	3
Heptageniidae		1	Q	
Tricorythodes sp.			1	1
Rithrogena sp.			4	
Trichoptera				
Hydropsyche sp.	Q		203	17
Agapetus sp.	1	Q	6	2
Lepidostoma sp.	Q			
Psychomyia sp.			1	3
Cheumatopsyche sp.			158	14
Brachycentrus			2	1
Oecetis			Q	1
Coleoptera (Elmidae)				
Larvae	3	3		Q
Adults	5	2		
Odonata				
Ophiogomphus sp.			2	
Amphipoda				
Gammarus sp.	Q			

Table 2. Continued

Station Organisms	Pinkham Creek Ups of Oz.Mah	Pinkham Creek DWS Oz. Mah @ Hwy 125	N. Platte Ups confluence	N. Platte DWS confluence
Mollusca				
Physa sp.	Q			
Sphaeridae	Q			
Diptera				
Simulidae	3	2	Q	
Chironomidae	Q	2	3	Q
Tipulidae	8		2	3
Total Kinds	19	11	22	18
Total Number/Sq. Ft.	60	52	407	57

Q = Organisms not collected in quantative sample, arbitarily given value of 1 for computing number of kinds.